Explain the genetic basis of biological heredity.

Multiple Choice:

1. Which of these is analogous to the function of DNA in a living organism?
   1. the motor that runs a car
   2. the blueprints for building a house
   3. the words that make up a book
   4. the heating and cooling system in a building
2. In an organ donation, it is important that the donor and recipient be as similar (genetically) as possible so that the organ will not be rejected by the recipient’s body. Which of the following people will make the best potential donor for a child?
   1. the child’s parent
   2. the child’s cousin
   3. the child’s sibling
   4. the child’s grandparent
3. Which of the following scenarios describes the correct base-pairing relationship in DNA?
   1. Adenine pairs with thymine.
   2. Adenine pairs with cytosine.
   3. Adenine pairs with guanine.
   4. Adenine pairs with uracil.
4. Mutagens are environmental factors that damage your DNA. Some of these can be passed to your offspring if you reproduce. Which of the following mutagens will be the most damaging to your future children if you were exposed to them as a teenager? (Assume you will not have children until you were 25.)
   1. Sunlight, because it damages your skin cells and the DNA there.
   2. X-rays, because they penetrate deep into your body and could damage DNA there.
   3. Cigarette smoke, because it damages your lung cells and the DNA there.
   4. Alcohol, because it damages your liver cells and the DNA there.
5. What is the term for the process of making a protein from a molecule of DNA?
   1. Replication
   2. Transcription
   3. Mutation
   4. Translation
6. What is the correct name for DNA?
   1. Deoxyribonucleic Acid
   2. Depoxyribonucleic Acid
   3. Detoxyribonucleic Acid
   4. Dehoxyribonucleic Acid
7. How does a molecule of DNA (which is much longer than your individual cells) fit inside of a cell?
   1. It folds and twists many times until it becomes very dense.
   2. It folds only.
   3. It twists only.
   4. None of the above.
8. Which of these reproductive processes would result in an individual that is genetically unique?
   1. Budding reproduction
   2. Cloning reproduction
   3. Sexual reproduction
   4. Binary Fission reproduction

Short Answer:

1. Where does your DNA come from?
2. Damage to your DNA is called a: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. The process of making a protein from a gene is called: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. If you have been exposed to dangerous UV rays that have damaged the DNA in your skin cells, will your future children have this same mutation? Why or why not?

Essay:

1. In terms of common DNA, describe how you are related to your grandparents (i.e. how much DNA do you have in common?).
2. How does each of your cells get its DNA?
3. Describe the process of DNA replication.
4. How does sexual reproduction ensure genetic diversity?
5. Describe how genes are expressed in terms of physical characteristics.
6. If a women has a child after age 35 the chances that the child will have a chromosomal defect (like Down’s Syndrome) is much higher than if the child had been born earlier in its mother’s life. Explain this.